



## Enumerating the various constraints of pulse cultivation perceived by the growers in northern part of West Bengal

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### ABSTRACT

Pulse is considered as main source of vegetable protein and also called as poor men meat. But in relation to the cultivation practice of pulse, the growers face lots of problems which are highlighted in the present study. The study conducted in four villages in Northern part of West Bengal. Randomly 100 respondents were selected for this study. An interview schedule was prepared to collect the data. Collected data were analyzed through statistical tools. The study revealed that in the districts, lack of infrastructural facility and good seeds at the time of sowing are the main infrastructural constraints. High cost of labour is a socio-economic constraint and proper knowledge about quality seeds is institutional constraint and lack of support price is a policy constraint which creates hindrances to the growers in pulse production. Therefore, the existing line departments are required to take proper initiative for mitigating various constraints faced by the pulse growers.

**Keywords** : Constraints, cultivation practice, hindrances, infrastructural, institutional, pulse-growers, technological

Globally pulses are grown in more than 171 countries occupying 72.30 million hectares area and contributing 64.40 million ton with average productivity of 890 kg ha<sup>-1</sup> in the triennium ending 2010-11 (Dubey, 2017). During 2017-18, India has put into more than 29 million hectares in pulse cultivation, harvested produce to the tune of 25.23 million tons recording an average productivity of 841 kg ha<sup>-1</sup>. India is reckoned as the largest producer and consumer of pulses in the world accounting 25 per cent of that global production, 27 per cent of consumption and 34 per cent of food use (Price *et al.*, 2003). By the 2050, we will be able to sustain our production and we turned to net importer to net exporter for pulses if everything goes as per plan. Another unique feature is its source of livelihood and still not a commercial business (Singh *et al.*, 2013a). Under the cultivation practices, only 16.1 per cent of pulse areas are covered under assured irrigation. India has the largest share about 25 per cent of production, about 31 per cent acreage and 27 per cent consumption of total pulses of the world. Enhancement of productivity of 789 kg ha<sup>-1</sup> during 12-13 to 841 kg ha<sup>-1</sup> during 2017-18 indicating a lopsided as well as sluggish growth. The pulse availability increases from 15.0 kg capita<sup>-1</sup> year<sup>-1</sup> in 1912 to 20.4 kg capita<sup>-1</sup> year<sup>-1</sup> during 2018 but its availability is quite lower than actual recommendation of World Health Organisation *i.e.* 80 gm capita<sup>-1</sup> day<sup>-1</sup> (29.2 kg capita<sup>-1</sup> year<sup>-1</sup>). The yield levels of pulses have remained low and stagnant, also area and total production. Number of districts harvesting more than 0.8 or 1 t ha<sup>-1</sup> yield of *kharif* pulses is very less (Annoymus, 2013).

Pulses form a major source of protein for a huge section of Indian population, particularly for the poor, backward classes of the traditionally vegetarian population (Reddy, 2004). Pulse is also called poor men meat. Pulses are also an excellent feed and fodder for livestock. Endowed with the unique ability of biological nitrogen fixation, carbon sequestration, soil amelioration, low water requirement and capacity to withstand harsh climate, pulses have remained an integral component of sustainable crop production system since time immemorial, especially in the dry areas (Ali and Gupta, 2012). But in reality, the net availability of pulses has come down from 61 to 37 gm day<sup>-1</sup> person<sup>-1</sup>.

Lentil (*masur*), *khesari*, gram and *mung* are the dominant pulses grown in the state and Nadia, Murshidabad, Malda, Purulia, Cooch Behar and Jalpaiguri are the leading pulses growing districts of the state. But low priority accorded to pulses crops may be related to their relatively low status in the cropping system as treated secondary importance, in many of the farmer's crop management attention. In addition to this, these crops are adversely affected by biotic and abiotic stress was not controlled properly (Reddy, 2009). Lentil, popularly known as *masur*, are mostly cultivated by the growers of state. In West Bengal, majority of the people in rural area are engaged in agriculture and allied sector. Among them 80 per cent of the people are small and marginal. It is believed that pulse is considered as poor men meat but the production of the state is not sufficient for consumption. Therefore, day by day the cost of pulses is going higher and higher within the state and outside the

state. There are many factors which affect the production and productivity of pulse cultivation. The awareness on scientific pulse cultivation practices, unavailability of certified seeds, poor irrigation facilities, poor structure post-harvest management facility and unleashing marketing facilities are some of the factors which creates a barrier in pulse cultivation. In this context, the present study has undertaken to enumerate the climatic, technological, socio-economic, infrastructural, situational, managerial and institutional policy constraints in pulse cultivation within the northern part of West Bengal.

## MATERIALS AND METHODS

The study was conducted in four village namely Gopalpur and Khagribari village under Cooch Behar block II of Cooch Behar district and Kalinagar and Gourangapur villages under Gazol block of Malda district within northern part of West Bengal. The village

was selected purposively and the exhaustive list of the pulse growers was prepared from the selected villages. Randomly 100 respondents were selected from the exhaustive list. The data were collected through well designed structured interview schedule. A focus group discussion (FGD) was also conducted in each villages to collect some secondary information related to the pulse cultivation practices and the associated perceived constraints. Constraints were categorized into climatic, managerial, infrastructural, socio-economic, technological, institutional and policy, and land & situational domains.

Extent of constraint was assessed through a 4-point scale following methodology developed by Likert (1932), with “No constraint (with 0 score)”, “Somewhat (with 1 score)”, “Moderate (with 2 score)” and “Extreme (with 3 score)”. Mean extent of a particular constraint was calculated with the following formula:

$$\text{Mean score for each constraint} = \frac{\text{Sum total of scores obtained by the constraint from all farmers}}{3 \times \text{No. of farmers}}$$

$$\text{Mean score for each Domain} = \frac{\text{Sum total of scores obtained by the domain from all farmers}}{3 \times \text{No. of constraint in the domain} \times \text{No. of farmers}}$$

## RESULTS AND DISCUSSION

Generally, pulses are grown as rain-fed crop in different parts of North Bengal. Due to its rain-fed nature, the growers face lots of challenges associated with the cultivation practices. The constraints and challenges are depicted below:

Perception of the respondent in climatic constraints in pulse cultivation

The above table 1 reveals that 76.00 per cent and 88.00 per cent of respondents from Cooch Behar and Malda district said that crop failure due to erratic rainfall had moderate effect. Crop failures due to foggy weather have no effect in both Cooch Behar (96.00 per cent of respondent) and Malda (98.00 per cent of respondent) district. 52.00 per cent and 50.00 per cent of respondents reported that crop failure due to very high or very low temperature have extreme effect in Cooch Behar district and moderate in Malda district. whereas crop failure due to cyclone or heavy storm have somewhat effect in Cooch Behar district as per 48.00 per cent of respondents and has moderate in Malda district as per 66.00 per cent of respondents.

Table 2 shows weed infestation factor have extreme effect in both Cooch Behar and Malda district as per perceived of 62.00 per cent and 82.00 per cent of respondents. 66.00 per cent and 88.00 per cent of respondents said that disease infestation factor have

moderate effect in both Cooch Behar and Malda district. The effect of insect attack has moderate effect in both Cooch Behar and Malda district by the 68.00 per cent and 58.00 per cent of respondents respectively. 96.00 per cent of respondents reported that the effect of none cultivates pulse have no effect in both Cooch Behar and Malda district. The effect of human factor in both Cooch Behar and Malda district have no effect as per perception of 90.00 per cent and 96.00 per cent of respondents whereas delayed showing of pulse crop have moderate effect on both Cooch Behar and Malda district as per perception of 50.00 per cent and 76.00 per cent of respondents.

Table 3 reveals that lack of good quality seeds at the time of sowing had moderate effect in Cooch Behar district and extreme effect in Malda district as per perception of 46.00 per cent and 64.00 per cent of respondents. The effect of non-availability of fertilizer in the market had somewhat effect in both Cooch Behar and Malda district as per the report of 52.00 per cent and 70.00 per cent of respondents.

The effect of non-availability of plant protection chemicals in the market had somewhat effect in both Cooch Behar and Malda district as well as per 56.00 per cent and 66.00 per cent of respondents, whereas lack of irrigation facilities at critical stage had somewhat effect in Cooch Behar district and moderate effect in Malda

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**Table 1: Extent of climatic constraints in pulse cultivation**

Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
CF-1	Crop failure due to erratic rainfall	Cooch Behar	0 (0.00)	10 (20.00)	38 (76.00)	2 (4.00)
		Malda	2 (4.00)	2 (4.00)	44 (88.00)	2 (4.00)
CF-4	Crop failure due to foggy weather	Cooch Behar	49 (98.00)	1 (2.00)	0 (0.00)	0 (0.00)
		Malda	48 (96.00)	0 (0.00)	2 (4.00)	0 (0.00)
CF-3	Crop failure due to very high or very low temperature	Cooch Behar	0 (0.00)	6 (12.00)	18 (36.00)	26 (52.00)
		Malda	1 (2.00)	2 (4.00)	25 (50.00)	22 (44.00)
CF-4	Crop failure due to cyclone or heavy storm	Cooch Behar	5 (10.00)	24 (48.00)	20 (40.00)	1 (2.00)
		Malda	8 (16.00)	9 (18.00)	33 (66.00)	0 (0.00)

*Note: Figures in the parenthesis indicate percentage*

**Table 2: Extent of managerial constraints in pulse cultivation**

Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
MC -1	Weed infestation	Cooch Behar	0 (0.00)	2 (4.00)	17 (34.00)	31 (62.00)
		Malda	0 (0.00)	0 (0.00)	9 (18.00)	41 (82.00)
MC -2	Disease infestation	Cooch Behar	0 (0.00)	7 (14.00)	33 (66.00)	10 (20.00)
		Malda	0 (0.00)	1 (2.00)	44 (88.00)	5 (10.00)
MC -3	Insect attack	Cooch Behar	0 (0.00)	6 (12.00)	34 (68.00)	10 (20.00)
		Malda	1 (2.00)	2 (4.00)	29 (58.00)	18 (36.00)
MC-4	None cultivates pulse	Cooch Behar	48 (96.00)	2 (4.00)	0 (0.00)	0 (0.00)
		Malda	48 (96.00)	1 (2.00)	1 (2.00)	0 (0.00)
MC -5	Human factor	Cooch Behar	45 (90.00)	4 (8.00)	1 (2.00)	0 (0.00)
		Malda	48 (96.00)	1 (2.00)	1 (2.00)	0 (0.00)
MC -6	Delayed sowing for previous land engagement	Cooch Behar	2 (4.00)	2 (4.00)	25 (50.00)	21 (42.00)
		Malda	4 (8.00)	1 (2.00)	38 (76.00)	7 (14.00)

*Note: Figures in the parenthesis indicate percentage*

**Table 3: Extent of infrastructural constraints in pulse cultivation**

Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
IC -1	Lack of good quality seeds at the time of sowing	Cooch Behar	1 (2.00)	5 (10.00)	23 (46.00)	21 (42.00)
		Malda	0 (0.00)	5 (10.00)	13 (46.00)	32 (64.00)
IC -2	Non-availability of fertilizer in the market	Cooch Behar	17 (34.00)	26 (52.00)	7 (14.00)	0 (0.00)
		Malda	6 (12.00)	35 (70.00)	9 (18.00)	0 (0.00)
IC -3	Non –availability of plant protection chemicals in the market	Cooch Behar	20 (40.00)	28 (56.00)	2 (4.00)	0 (0.00)
		Malda	13 (26.00)	33 (66.00)	4 (8.00)	0 (0.00)
IC -4	Lack of irrigation facilities at critical stage	Cooch Behar	11 (22.00)	29 (58.00)	9 (18.00)	1 (2.00)
		Malda	5 (10.00)	19 (38.00)	26 (52.00)	0 (0.00)
IC -5	Lack of FYM or other organic manure	Cooch Behar	31 (64.00)	17 (34.00)	2 (4.00)	0 (0.00)
		Malda	14 (28.00)	35 (70.00)	1 (2.00)	0 (0.00)

*Note: Figures in the parenthesis indicate percentage*

**Table 4: Extent of socio-economic constraints in pulse cultivation**

Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
SE -1	High cost inputs	Cooch Behar	12(24.00)	32(64.00)	5(10.00)	1(2.00)
		Malda	3(6.00)	45(90.00)	2(4.00)	0(0.00)
SE -2	High cost of labour	Cooch Behar	18(36.00)	6(12.00)	4(8.00)	22(44.00)
		Malda	1(2.00)	3(6.00)	31(62.00)	15(30.00)
SE -3	Labour scarcity	Cooch Behar	17(34.00)	6(12.00)	4(8.00)	23(46.00)
		Malda	2(4.00)	5(10.00)	34(68.00)	9(18.00)
SE -4	Lack of subsidy for inputs	Cooch Behar	5(10.00)	3(6.00)	39(78.00)	3(6.00)
		Malda	6(12.00)	5(10.00)	39(78.00)	0(0.00)
SE -5	Low profit	Cooch Behar	13(26.00)	9(18.00)	26(52.00)	2(4.00)
		Malda	39(78.00)	7(14.00)	4(8.00)	0(0.00)
SE-6	Competition with alternative remunerative crops	Cooch Behar	8(16.00)	9(18.00)	16(32.00)	17(34.00)
		Malda	44(88.00)	4(8.00)	1(2.00)	1(2.00)

Note: Figures in the parenthesis indicate percentage

**Table 5: Extent of technological constraints in pulse cultivation**

Code	Constraints faced	Districts	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
TC -1	Lack of proper knowledge about quality seeds	Cooch Behar	2(4.00)	9(18.00)	37(74.00)	2(4.00)
		Malda	2(4.00)	5(10.00)	16(32.00)	27(54.00)
TC -2	Lack of proper knowledge about seed rate and sowing	Cooch Behar	2(4.00)	8(16.00)	40(80.00)	0(0.00)
		Malda	1(2.00)	7(14.00)	40(80.00)	2(4.00)
TC -3	Lack of knowledge about seed treatment	Cooch Behar	1(2.00)	13(26.00)	34(68.00)	2(4.00)
		Malda	3(6.00)	5(10.00)	39(78.00)	3(6.00)
TC -4	Lack of knowledge about fertilizer dose	Cooch Behar	1(2.00)	11(22.00)	38(76.00)	0(0.00)
		Malda	2(4.00)	5(10.00)	40(80.00)	3(6.00)
TC -5	Lack of knowledge about method of fertilizer application	Cooch Behar	5(10.00)	20(40.00)	25(50.00)	0(0.00)
		Malda	6(12.00)	7(14.00)	36(72.00)	1(2.00)
TC -6	Lack of knowledge about weed management	Cooch Behar	1(2.00)	16(32.00)	33(66.00)	0(0.00)
		Malda	4(8.00)	2(4.00)	14(28.00)	30(60.00)
TC -7	Lack of knowledge about insect pest management	Cooch Behar	1(2.00)	15(30.00)	34(68.00)	0(0.00)
		Malda	4(8.00)	6(12.00)	28(56.00)	12(24.00)
TC -8	Lack of knowledge about disease management	Cooch Behar	3(6.00)	11(22.00)	36(72.00)	0(0.00)
		Malda	3(6.00)	4(8.00)	35(70.00)	8(16.00)
TC -9	Lack of knowledge about post harvest management	Cooch Behar	4(8.00)	24(48.00)	20(40.00)	2(4.00)
		Malda	4(8.00)	23(46.00)	20(40.00)	3(6.00)

Note: Figures in the parenthesis indicate percentage

district report by the 58.00 per cent and 52.00 per cent of respondents respectively. The lack of FYM or other organic manures had no effect in Cooch Behar district but somewhat effect in Malda district as per the perception of respondent.

Table 4 reveals that the effect of high cost of input have somewhat effect in both Cooch Behar and Malda

district as per perception of 64.00 per cent and 90.00 per cent of respondents respectively, whereas high cost of labour has extreme effect in Cooch Behar district and moderate effect in Malda district having as per report of 44.00 per cent and 62.00 per cent respondents. The labour scarcity have extreme effect in Cooch Behar district and moderate in Malda district by the response

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**Table 6: Extent of institutional and policy constraints in pulse cultivation**

Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
IP -1	Lack of training facility	Cooch Behar	1(1.00)	28(56.00)	20(40.00)	3(6.00)
		Malda	2(4.00)	9(18.00)	37(74.00)	2(4.00)
IP -2	Lack of credit facility	Cooch Behar	8(16.00)	30(60.00)	12(24.00)	0(0.00)
		Malda	5(10.00)	20(40.00)	24(48.00)	1(2.00)
IP -3	No facilities for post-harvest management	Cooch Behar	13(26.00)	28(56.00)	9(18.00)	0(0.00)
		Malda	9(18.00)	29(58.00)	1(2.00)	1(2.00)
IP -4	Lack of regulated market	Cooch Behar	2(4.00)	28(56.00)	19(38.00)	1(2.00)
		Malda	2(4.00)	35(70.00)	13(26.00)	0(0.00)
IP -5	Lack of proper storage facility	Cooch Behar	3(6.00)	20(40.00)	25(50.00)	2(4.00)
		Malda	5(10.00)	6(12.00)	37(74.00)	2(4.00)
IP -6	Non-existence of proper marketing channel	Cooch Behar	43(86.00)	6(12.00)	1(2.00)	0(0.00)
		Malda	45(90.00)	5(10.00)	0(0.00)	0(0.00)
IP -7	Lack of linkage between farmer and kisanmandi	Cooch Behar	39(78.00)	3(6.00)	8(16.00)	0(0.00)
		Malda	42(84.00)	3(6.00)	5(10.00)	0(0.00)
IP -8	Lack of support price	Cooch Behar	4(8.00)	6(12.00)	40(80.00)	0(0.00)
		Malda	2(2.00)	1(1.00)	47(94.00)	0(0.00)

Note: Figures in the parenthesis indicate percentage

**Table 7: Extent of land and situational constraints in pulse cultivation**

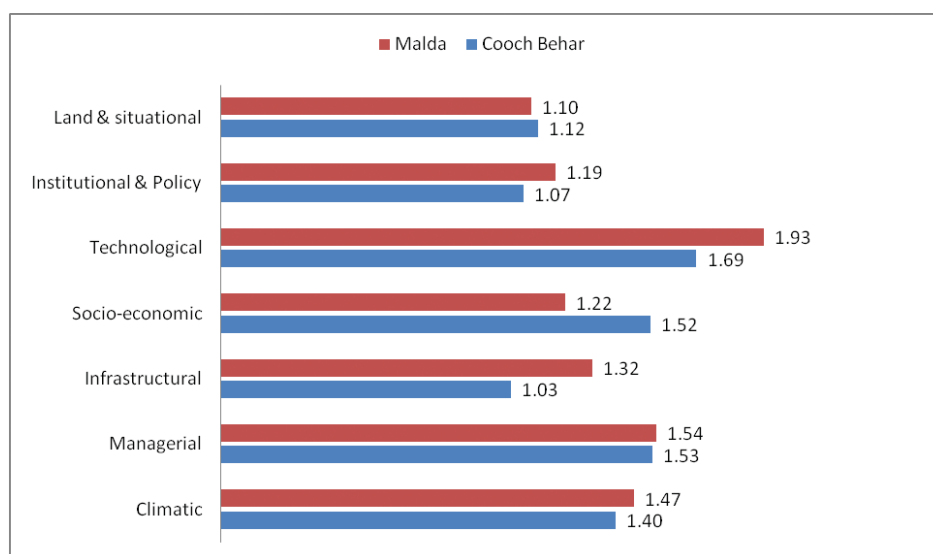
Code	Constraints faced	District	No (%)	Number of farmers		
				Somewhat	Moderate	Extreme
LS -1	Improper land situation for pulse	Cooch Behar	5(10.00)	18(36.00)	27(54.00)	0(0.00)
		Malda	2(4.00)	7(14.00)	41(84.00)	0(0.00)
LS -2	Low fertility of land	Cooch Behar	4(8.00)	14(28.00)	29(58.00)	3(6.00)
		Malda	6(12.00)	11(22.00)	31(62.00)	2(4.00)
LS -3	Irrigation facilities lacking at critical stage	Cooch Behar	15(30.00)	15(30.00)	20(40.00)	0(0.00)
		Malda	14(28.00)	6(12.00)	29(58.00)	1(2.00)
LS -4	Non-availability of land for pulse cultivation owing to occupy by other crops in the cropping sequence	Cooch Behar	41(82.00)	3(6.00)	6(12.00)	0(0.00)
		Malda	44(88.00)	3(6.00)	3(6.00)	0(0.00)
LS -5	Small size of holding land/ fragmented land for mechanisation	Cooch Behar	9(18.00)	24(48.00)	17(34.00)	0(0.00)
		Malda	28(56.00)	14(28.00)	7(14.00)	1(2.00)

Note: Figures in the parenthesis indicate percentage

of 46.00 per cent and 68.00 per cent respondents. Lack of subsidy for inputs had moderate effect in both Cooch Behar and Malda district as per perception of 78.00 per cent of respondents. The effect of low profit have moderate effect in Cooch Behar district and no effect in Malda district having 52.00 per cent and 78.00 per cent of respondents, whereas the effect of competition with alternative remunerative crops have extreme effect in

Cooch Behar district and no effect in Malda district of respondents.

Table 5 shows that lack of proper knowledge about quality seeds have moderate effect in Cooch Behar district and extreme effect in Malda district as per response of 74.00 per cent and 54.00 per cent of respondents respectively. 80.00 per cent of respondents said that lack of proper knowledge about seed rate and



**Fig. 1: Comparative picture of constraints faced by the pulse growers in Cooch Behar and Malda district**

sowing had moderate effect in both Cooch Behar and Malda district. 68.00 per cent and 78.00 per cent of respondents reported that lack of knowledge about seed treatment had moderate effect in both Cooch Behar and Malda district followed by lack of knowledge about fertilizer dose had moderate effect in both Cooch Behar and Malda district as per perception of 76.00 per cent and 80.00 per cent of respondents. Lack of knowledge about method of fertilizer application had moderate effect in both Cooch Behar and Malda district as per response of 50.00 per cent and 72.00 per cent of respondents and due to lack of knowledge about weed management had moderate effect in Cooch Behar district and extreme effect in Malda district which is reported by 66.00 per cent and 60.00 per cent of respondents. 68.00 per cent and 58.00 per cent of respondents said that lack of knowledge about insect pest management had moderate effect in both Cooch Behar and Malda district whereas lack of knowledge about disease management had moderate effect in both Cooch Behar and Malda district reported by 72.00 per cent and 70.00 per cent of respondents respectively. 48.00 per cent and 46.00 per cent of respondents made perception of that lack of knowledge about post-harvest management have somewhat effect in both Cooch Behar and Malda district.

The table 6 reveals that the lack of training facility had somewhat effect in Cooch Behar district and moderate effect in Malda district as per the perception of 56.00 per cent and 74.00 per cent of respondents followed by lack of credit facility had somewhat effect in Cooch Behar district and moderate effect in Malda district as per 60.00 per cent and 48.00 per cent of respondents. 56.00 per cent and 58.00 per cent of

respondents reported that there is no facilities for post-harvest management had somewhat effect in both Cooch Behar and Malda district.

Lack of regulated market have somewhat effect in both Cooch Behar and Malda district as per response of 56.00 per cent and 70.00 per cent of respondents followed by lack of proper storage facility had moderate effect in both Cooch Behar and Malda district as per response of 50.00 per cent and 74.00 per cent of respondents. 86.00 per cent and 90.00 per cent of respondents said that non-existence of proper marketing channel had no effect in both Cooch Behar and Malda district whereas the lack of linkage between farmer and kisan mandi have no effect in both Cooch Behar and Malda district as per perception of 78.00 per cent and 84.00 per cent of respondents. Lack of support price had moderate effect in both Cooch Behar and Malda district as per the report of 80.00 per cent and 94.00 per cent of respondents.

Data from the above table 7 reveals that improper land situation for pulse had moderate effect in both Cooch Behar and Malda district as per response of 54.00 per cent and 84.00 per cent of respondents followed by low fertility of land had moderate effect in both Cooch Behar and Malda district reported by 58.00 per cent and 62.00 per cent of respondents. 40.00 per cent and 58.00 per cent of respondents said that lacking of irrigation facilities at critical stage had moderate effect in both Cooch Behar as well as in Malda district. Non-availability of land for pulse cultivation owing to occupied by other crops in the cropping sequence had no effect in both Cooch Behar and Malda district as per the perception of 82.00 per cent and 88.00 per cent of

respondents. 48.00 per cent and 56.00 per cent of respondents said that small size of land holding / fragmented land for mechanization had somewhat effect in Cooch Behar district and no effect in Malda district.

#### **Comparison between districts on extent of constraints**

Fig. 1 represents a comparison between two districts on perceived extent of constraints on different domains. It is found that the most severe constraints were perceived in the field of technological domain (Mean scores are 1.93 and 1.69 in Malda and Cooch Behar respectively) followed by managerial (Mean scores are 1.54 and 1.53 in Malda and Cooch Behar respectively), climatic (Mean scores are 1.47 and 1.40 in Malda and Cooch Behar respectively) and socio-economic (Mean scores are 1.52 and 1.22 in Cooch Behar and Malda respectively).

Comparative mean analysis (t-value = 0.759 which is not significant) suggests that the two districts are homogeneous in respect of constraints faced towards pulse cultivation.

India has the largest share about 25 per cent of production but still the productivity of pulses is very low compare to other country. It is seen that lack of quality seeds, high cost of labour, lack of support price for produce, lack of proper knowledge about quality seeds are the most crucial constraints as perception of the pulse growers. So, it is suggested that the farmers are encouraged to attend various training and exposure programmes conducted by the different line department for scientific production of pulse crops. The study clearly indicates that imparting good numbers of skill based training programmes with proper follow-up activities will

help the pulse growers to reduce constraints and encourage more production.

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